13 Excretion in human

Excretory Products and Organs

The body excretes waste products through several organs:

Excretory Product	Excretory Organ	Source
Carbon Dioxide (CO_2)	**Lungs**	Waste product of aerobic respiration.
Urea	**Kidneys** (in urine)	Waste from the breakdown of excess amino acids (toxic).
Excess Water & Ions	**Kidneys** (in urine)	Substances in excess of the body's requirements.

The **Urinary System** is the main route for removing nitrogenous waste and excess water/ions. It consists of the **kidneys, ureters, bladder, and urethra**.

The Kidney: Structure and Function

The kidney is the primary organ for filtering the blood and forming urine.

Kidney Structure

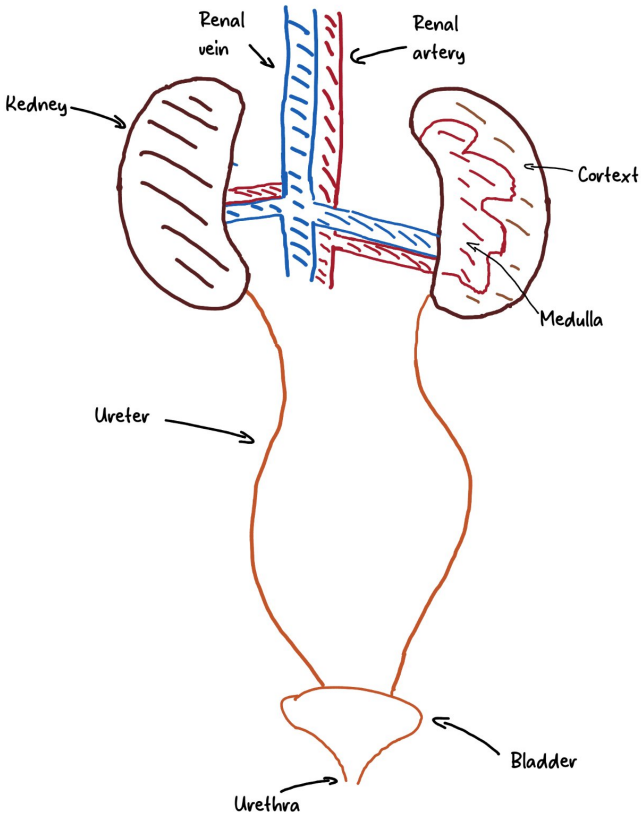
The kidney is composed of two main regions:

- **Cortex:** The outer layer.
- **Medulla:** The inner region.

Nephron Function (Urine Formation)

The nephron is the functional unit of the kidney, responsible for three main stages of urine formation:

1. **Filtration:** The **glomerulus** filters the blood, allowing water, glucose, urea, and ions to pass out of the blood, while blood cells and proteins (large molecules) stay in blood.
2. **Reabsorption:** The renal tubules reabsorbs **all of the glucose (active transport)**, some of the ions, and most of the water back into the blood.
3. **Urine Formation:** The final fluid is **urine**, which contains urea, excess water, and excess ions.



The Role of the Liver

The liver manages the body's amino acid supply and is the site of urea formation.

Assimilation of Amino Acids

The liver uses amino acids absorbed from the small intestine to synthesise essential proteins, a process known as **assimilation**.

Urea Formation (Deamination)

When there is an excess of amino acids, the liver converts them into urea:

1. **Deamination** is the **removal of the nitrogen-containing part of amino acids to form urea**.
2. The amino group is removed, converted into ammonia, and then quickly into the less toxic substance, **urea**.
3. The remaining part of the amino acid molecule is converted to carbohydrate and can be respired or stored.